Trends, Innovations and the Future of Food-Product Development

Clare M. Hasler-Lewis
Robert Mondavi Institute for Wine and Food Science
University of California
Davis, California

cmhasler@ucdavis.edu

Without question, health is on the front burner of trends, innovations and future food-product development efforts (Rahavi and Kapsak, 2010). More than ever before, consumers are interested in how to get healthier through diet: the secrets of eating smarter and the science of staying healthy. What really makes us fat? Do low-carb diets really work? What should we eat to help us live longer (Park, 2010)?

Diet trends are not new. And, unfortunately, many diet trends of the past 70 years have not been healthful—some even unsafe (Younger, 2009). For example, in response to a 1929 *Lucky Strike* cigarette advertising campaign ("Reach for a Lucky instead of a Sweet"), smoking became the approach to weight loss for many in the 1930s and '40s (Watlins, 1959). In the 1950s, people prayed for weight loss. Support groups and cabbage soup were strategies in the 1960s. In the 1970s diet pills (McBee, 1968) were the rage, followed by the Scarsdale diet (Tarnower, 1979) in the 1980s. And who can forget the low-carb craze of the 1990s (Atkins, 1992)? During the last decade "lite" foods were hot (Heasman, 1993) and more recently the "100 calorie" snack (Sloan, 2006). Foods provided in 100-calorie portion sizes have impacted food categories ranging from nuts to crackers to soups—even candy (Figure 1)—in an effort to address escalating obesity.

Escalating Obesity

Obesity has grown into a major public-health crisis over the last 25 years (Flegal *et al.*, 2010). In 1985, only 10% of the US population was obese. In 2008, obesity exceeded 20% in all but one state (Colorado); it exceeded 30% in more than half a dozen others. The health consequences of obesity are numerous (CDC, 2009a), contributing to heart disease, stroke, several types of cancer (including colon, prostate and breast cancers) and diabetes. Obesity also increases surgery risk and causes gastrointestinal problems, and it shortens life by 6 to 7 years.

Figure 1. An answer to the obesity problem?

Obesity has reached epidemic proportions on a global scale, and public-health organizations are taking action. In 2009, the Centers for Disease Control and Prevention (CDC) hosted *Weight of the Nation*, an inaugural conference on obesity prevention and control (CDC, 2009b). Of particular concern is the incidence of childhood obesity (Daniels, 2009), which has tripled in the last 30 years (CDC, 2010). A study in the *New England Journal of Medicine* found that about 80% of children who were overweight at age 10–15 years were obese adults at age 25 (Whitaker *et al.*, 1997). In February 2009, First Lady Michelle Obama launched *Let's Move*, an anti-obesity campaign targeted at children (White House Office of the First Lady, 2010). If childhood obesity continues to increase unabated, some public-health experts speculate that this will be the first generation that has a shorter life expectancy than their parents' (Olshansky *et al.*, 2005). Therefore, it is not surprising that the one of the top-ten functional food trends is "foods for ailing adolescents" (Sloan, 2010a). We can expect to see many more functional-food products targeted at children, particularly for weight control.

Food-Consumption Trends

According to the *2009 Food & Health Survey* from the International Food Information Council (IFIC), 71% of adults are changing the *amounts* of food they eat to lose or maintain weight (IFIC, 2009a). They are also changing the *types* of foods or food components they eat. But fewer than 20% are counting calories and only 11% of consumers correctly estimated their daily caloric intake; 47% overestimated their energy needs (IFIC, 2009a).

According to the June 2010 report of the Dietary Guidelines Advisory Committee, "it is time for everyone in this country to know how many calories they need in a day" (DGAC, 2010).

Another food-innovation strategy that companies have used to address the obesity epidemic is the development of products containing bioactive components that increase energy metabolism. One example is Enviga—a line of sparkling green-tea beverages jointly marketed by the Coca-Cola company and Nestlé (http://www.enviga.com). Enviga contains a unique combination of bioactive ingredients (green-tea antioxidants and caffeine) that burn calories by increasing metabolism. Product claims state that consuming three cans burns 60 to 100 calories. Not surprisingly, these claims are highly controversial (CSPI, 2007). Of course an equivalent number of calories can be expended by walking a mile, which is more healthful and also free.

Eating to Lose Weight

Certain foods or food categories are also being investigated for weight-loss benefits, including dairy products (Lanou and Barnard, 2008). A recent meta-analysis of thirteen randomized, controlled trials found that increasing daily calcium intake from dairy by 1,241 mg/day was associated with an increase in excretion of fecal fat of 5.2 g/day compared with low calcium (<700 mg/day), which could be relevant for weight management (Christensen *et al.*, 2009). However, the clinical evidence for the role of dairy products in weight loss is still relatively modest (Zemel, 2009). Almonds are also being investigated for their role in weight management. They are a good source of fiber, which increases satiety, and recent evidence from clinical studies showed no weight gain even when adding in excess of 300 almond calories a day to the diet (Hollis and Mattes, 2007).

Getting away from highly processed foods and back to whole foods, "whole health eating," is a leading diet trend. Consumers are interested in foods that not only aid weight loss, but also help them live a healthier, longer life, referred to as "functional foods" (Hasler and Brown, 2009). A 2005 expert-panel report from the Institute of Food Technologists (IFT) defined these as "foods and food components that provide a health benefit beyond basic nutrition" (IFT, 2005). Interest in naturally functional foods and whole-food nutrition is likely to be one of the strongest health trends for the next 10 years (Sloan, 2009).

Several factors are driving the healthy-eating trend, including wellness-focused consumers, an epidemic of chronic disease driven in part by aging demographics, rising healthcare costs, food innovation, public-health policy, a business opportunity, and an overwhelming body of literature linking diet to health and wellness (Hasler and Brown, 2009).

According to a recent article in *Prepared Foods Magazine*, health and wellness will continue to be top priorities for consumers, and their interest will continue to drive the functional-foods sector (Rahavi and Kapsak, 2010). A recent "State of the Industry" report in *Food Technology Magazine*, "What, When and Where America Eats," stated that 66% of consumers are eating to manage specific health issues (Sloan, 2010b). According to the IFIC *2009 Foods for Health Consumer Trending Survey*, cardiovascular disease—including heart disease, cholesterol level, blood pressure and stroke—was cited as the leading health concern by 48% of consumers (IFIC, 2009b).

Heart Disease

Salt

Consumers *should* be concerned about heart disease, as it continues to be the leading killer of men and women in the United States (AHA, 2010). One of the next product-development challenges to address growing concerns about heart disease will be sodium reduction (Katz and Williams, 2010; Kuhn, 2010). A study recently published in the *New England Journal of Medicine* showed that cutting salt intake by just 3 g a day—the equivalent of half a teaspoon—could reduce the number of new cases of coronary heart disease each year by 60,000–120,000 and save an estimated $10–$24 billion in healthcare costs yearly (Bibbins-Domingo *et al.* 2010) (Figure 2).

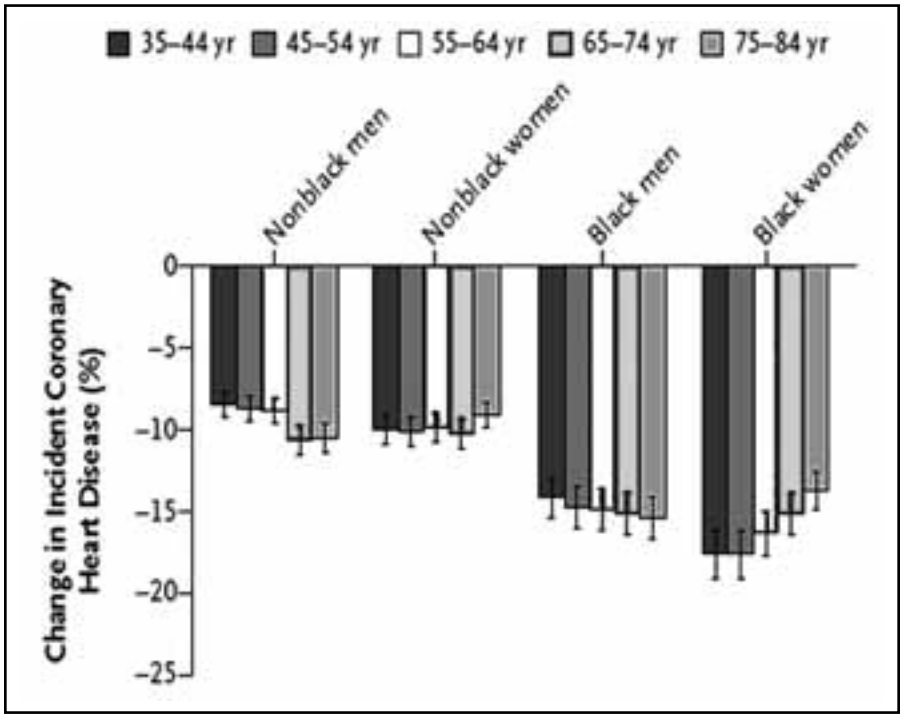

Figure 2. Potential effects of cutting salt intake by 3 g/day (Bibbins-Domingo *et al.*, 2010).

Although the contribution of excess sodium to morbidity and mortality from cardiovascular disease is considered to be fairly well established (Strazzullo *et al.*, 2009), not all experts agree that there is a comprehensive need for sodium restriction in prepared foods (Alderman, 2010). The current dietary guidelines recommend an upper daily intake of 2,300 mg of sodium, whereas the average American consumes nearly 3,500 mg/day (USDA, 2008). For people with hypertension, all African-Americans and those over 40 years of age, the recommendation is 1,500 mg. Approximately 70% of the US popula-

tion falls into this lower-sodium group. Furthermore, nearly 80% of individuals don't know the current recommended daily amount of sodium that an average adult should consume (IFIC, 2010).

The number of food products with low sodium claims has soared in the last few years (Scott-Thomas, 2010a). With sodium restriction a major focus of the 2010 dietary guidelines (USDA-DHHS, 2010), we can expect the development of many more restricted sodium products in the future. In March, Kraft announced that it will cut sodium in products by 10% over the next 2 years (Kraft, 2010). Other companies, including General Mills, are following suit (Scott-Thomas, 2010b). In April 2010, the New York City Department of Health launched the *National Salt Reduction Initiative*—a partnership of cities, states and national health organizations guiding a voluntary reduction of salt levels in packaged and restaurant foods (Katz, 2010). The food-innovation challenge is: how will mandatory sodium reduction in foods affect taste? Taste is still the leading factor influencing purchases of foods and beverages—more important than even price or healthfulness (IFIC, 2009a).

Vitamin D

Another future product-development focus will likely be vitamin-D fortification. In addition to its essential role in bone health, vitamin D may reduce the risk of various types of cancer (Krisnan *et al.*, 2010) and also boost immune function (Maruotti and Cantatore, 2010). Many individuals have suboptimal vitamin-D levels (Kennel *et al.*, 2010), and emerging research suggests that they are at greater risk of mortality from cardiovascular disease or other causes (Melamed *et al.*, 2008; Ginde *et al.*, 2009). Recently, an Institute of Medicine committee was named to undertake a study to assess current relevant data and update as appropriate dietary reference intakes (DRIs) for vitamin D and calcium (http://www.iom.edu/Activities/Nutrition/DRIVitDCalcium.aspx). The current recommendation for vitamin D intake established by the Food and Nutrition Board ranges from 200 to 600 IU. Some experts believe we may need 1,000 to 2,000 IU/day for optimal health (Landers, 2009). Vitamin-D intake recommendations are very likely to increase in the near future, which will result in supplementation of many more food products on the market or promotion of their natural vitamin-D content. An innovative strategy enhances vitamin-D content in mushrooms (*e.g.* Figure 3), the only known commodity crop that naturally contains vitamin D. A serving of conventionally cultivated mushrooms (*i.e.* grown in the dark) contains ~4% of the daily value (DV) of vitamin D (http://www.ars.usda.gov/SP2UserFiles/Place/12354500/Data/SR22/nutrlist/sr22a324.pdf). However, brief exposure to UV light can increase that to over 800% of the DV (Koyyalamudi, 2009). In 2009, *Good Housekeeping* awarded one of its first annual VIP (Very Innovative Product) awards to vitamin-D enhanced mushrooms (http://www.goodhousekeeping.com/product-testing/reviews-tests/appliances-electronics/innovate-products-awards).

In Summary

Interest in whole-food nutrition will be a leading trend in the food industry for the foreseeable future. More and more consumers are proactively influencing their own health by

including functional foods in their diets. Future food-product development efforts will include a focus on weight loss and sodium reduction. Vitamin D will be the new "hot" food ingredient. Taste still reigns, and foods must be fun! Americans are still not willing to give up all indulgences in the name of a healthy lifestyle (Anonymous, 2009).

Figure 3. Mushrooms enhanced in vitamin-D content.

References

Alderman MH (2010) Reducing dietary sodium: The case for caution. Journal of the American Medical Association 303(5) 448–449.

American Heart Association (AHA) (2010) Heart Disease and Stroke Statistics–2010 Update. Dallas: American Heart Association. http://www.americanheart.org/presenter.jhtml? identifier=1200026.

Anonymous (2009) Health & wellness: Redefining healthy living. Times & Trends November. http://supermarketnews.com/images/T_T-November-2009-Healthy-Living.pdf.

Atkins RC (1992) Dr. Atkins' New Diet Revolution. New York: M. Evans and Company, Inc.

Bibbins-Domingo *et al.* (2010) Projected effect of dietary salt reductions on future cardiovascular disease. New England Journal of Medicine 362(7) 590–599.

Center for Science in the Public Interest (CSPI) (2007) Enviga Study Casts Doubt on Calorie Burning & Weight-Loss Claims. Washington, DC: Center for Science in the Public Interest. http://www.cspinet.org/new/200702121.html.

Centers for Disease Control and Prevention (CDC) (2009a) Overweight and Obesity: Health Consequences. Atlanta: Centers for Disease Control and Prevention. http://www.cdc.gov/obesity/causes/health.html.
Centers for Disease Control and Prevention (CDC) (2009b) CDC Features: Weight of the Nation. Atlanta: Centers for Disease Control and Prevention.http://www.cdc.gov/Features/ WeightoftheNation/.
Centers for Disease Control and Prevention (CDC) (2010) Overweight and Obesity: Childhood Overweight and Obesity. Atlanta: Centers for Disease Control and Prevention. http://www.cdc.gov/obesity/childhood/index.html.
Christenssen R *et al.* (2009) Effect of calcium from dairy and dietary supplements on faecal fat excretion: A meta-analysis of randomized controlled trials. Obesity Reviews 10(4) 475–86.
Daniels SR (2009) Complications of obesity in children and adolescents. International Journal of Obesity 33 S60–S65.
Dietary Guidelines Advisory Committee (DGAC) (2010) Report of the Dietary Guidelines Advisory Committee on the Dietary Guidelines for Americans, 2010. http://www.cnpp.usda.gov/DGAs2010-DGACReport.htm.
Flegal KM *et al.* (2010) Prevalence and trends in obesity among US Adults, 1999–2008. Journal of the American Medical Association 303(3) 235–241.
Ginde AA *et al.* (2009) Prospective study of serum 25-hydroxyvitamin D level, cardiovascular disease mortality, and all-cause mortality in older U.S. Adults. Journal of the American Geriatrics Society 57(9) 1595–1603.
Hasler CM Brown A (2009) Position of the American Dietetic Association: Functional foods. Journal of the American Dietetic Association 109 735–746.
Heasman M (1993) Nutrition and technology: The development of the market for "lite" products. British Food Journal 92(8) 5–13.
Hollis J Mattes R (2007) Effect of chronic consumption of almonds on bodyweight in healthy humans. British Journal of Nutrition 98(3) 651–656.
Institute of Food Technologists (IFT) (2005) Functional Foods: Opportunities and Challenges. Institute of Food Technologists Expert Reports. http://www.ift.org.
International Food Information Council (IFIC) (2009a) 2009 Food & Health Survey: Consumer Attitudes Toward Food, Nutrition and Health.http://www.foodinsight.org/Resources/Detail.aspx?topic=2009_Food_Health_Survey_Consumer_Attitudes_toward_Food_Nutrition_and_Health
International Food Information Council (IFIC) (2009b) 2009 Functional Foods/Foods for Health Consumer Trending Survey. http://www.foodinsight.org/Resources/Detail.aspx?topic=2009_ Functional_Foods_Foods_For_Health_Consumer_Trending_Survey_Executive_Summary.
International Food Information Council (IFIC) (2010) Consumer Sodium Research: Concern, Perceptions and Action.http://www.foodinsight.org/Resources/Detail.aspx?topic=Consumer_ Sodium_Research_Concern_Perceptions_and_Action.
Katz B (2010) New York City Leads Drive to Cut U.S. Salt Intake.http://www.reuters.com/article/idUSTRE60A4EN20100111.

Katz B Williams LA (2010) Salt reduction gains momentum. Food Technology Magazine 64(5) 24–32.
Kennel K *et al.* (2010) Vitamin D deficiency in adults: When to test and how to treat. Mayo Clinic Proceedings 85(8) 752–758.
Koyyalamudi SR (2009) Vitamin D2 formation and bioavailability from *Agaricus bisporus* button mushrooms treated with ultraviolet irradiation. Journal of Agricultural and Food Chemistry 57(8) 3351–3355.
Kraft (2010) Kraft Foods Plans to Reduce Sodium in North American Products: More Than 10 Million Pounds of Salt to be Eliminated. Kraft Foods News Release March 17. http://www.kraftfoodscompany.com/mediacenter/country-press-releases/us/2010/us_pr_03172010.aspx.
Krishnan AV *et al.* (2010) The role of vitamin D in cancer prevention and treatment. Endocrinology Metabolism Clinics in North America 39(2) 401–418.
Kuhn ME (2010) Strategies for reducing sodium in the US. Food Technology Magazine 64(5) 34–36.
Landers S (2009) IOM Studies Boost in Vitamin D Requirements: Researchers Suggest a Huge Bump in Recommended Daily Levels as the Vitamin's Benefits Extend to Helping Fight Diabetes, Cancer and Cardiovascular Disease. http://www.ama-assn.org/amednews/2009/04/20/hlsa0420.htm.
Lanou AJ Barnard ND (2008) Dairy and weight loss hypothesis: An evaluation of the clinical trials. Nutritional Reviews 66(5) 272–279.
Maruotti N Cantatore FP (2010) Vitamin D and the immune system. Journal of Rheumatology 37(3) 491–495.
Melamed M *et al.* (2008) 25-Hydroxyvitamin D levels and the risk of mortality in the general population. Archives of Internal Medicine 168(15) 1629–1637.
McBee S (1968) Scandal of the diet pills. Life Magazine 64(4) 22–28.
Olshansky SJ *et al.* (2005) A potential decline in life expectancy in the United States in the 21st century. New England Journal of Medicine 352(11) 1138–1145.
Park A (2010) How to live 100 Years. Time February 11. http://www.time.com/time/specials/packages/article/0,28804,1963392_1963365,00.html.
Rahavi EB Kapsak WR (2010) Health and wellness product development—February 2010. Prepared Foods Network February 1 2010. http://www.preparedfoods.com/Articles/ Article_Rotation/BNP_GUID_9-5-2006_A_10000000000000752310.
Scott-Thomas C (2010a) US low-sodium product launches soar—but consumers go for taste. Food Navigator-USA.com April 12. http://www.foodnavigator-usa.com/Financial-Industry/US-low-sodium-product-launches-soar-but-consumers-go-for-taste.
Scott-Thomas C (2010b) General Mills Announces Sodium Reduction Strategy. Food Navigator-USA.com April 14. http://www.foodnavigator-usa.com/Financial-Industry/General-Mills-announces-sodium-reduction-strategy.
Sloan AE (2006) Top 10 functional food trends. Food Technology Magazine 60(4) 20–40.
Sloan AE (2009) Top 10 food trends. Food Technology Magazine 63(4) 22–42.
Sloan AE (2010a) Top 10 functional food trends. Food Technology Magazine 64(4) 22–41.

Sloan AE (2010b) What, when and where America eats. Food Technology Magazine 64(1) 18–27.
Strazzullo P *et al.* (2009) Salt intake, stroke, and cardiovascular disease: Meta-analysis of prospective studies. British Medical Journal 339 b4567.
Tarnower H Baker SS (1979) The Complete Scarsdale Medical Diet. New York: Bantam Books.
US Department of Agriculture (USDA) (2008) Nutrient Intakes from Food: Mean Amounts Consumed per Individual, One Day, 2005–2006. Agricultural Research Service. http://www.ars.usda.gov/ba/bhnrc/fsrg.
US Departments of Agriculture and Department of Health and Human Services (USDA-DHHS) (2010) Announcement of the availability of the final report of the dietary guidelines advisory committee, solicitation of written comments on the report, and invitation for oral testimony at a public meeting. Federal Register 75(114) 33759–33760.
Watlins JL (1959) 100 Greatest Advertisements 1852–1958: Who Wrote Them And What They Did. New York: Dover Publications, Inc.
Whitaker *et al.* (1997) Predicting obesity in young adulthood from childhood and parental obesity. New England Journal of Medicine 337(13) 869–873.
White House Office of the First Lady (2010) First Lady Michelle Obama Launches Let's Move: America's Move to Raise a Healthier Generation of Kids. http://www.whitehouse.gov/the-press-office/first-lady-michelle-obama-launches-lets-move-americas-move-raise-a-healthier-genera.
Younger A (2009) Diet Trends of the Last 70 Years. http://www.thatsfit.com/2009/12/03/wacky-diet-trends/.
Zemel M (2009) Proposed role of calcium and dairy food components in weight management and Metabolic Health. Physician and Sportsmedicine 37(2) 29–39.

Clare M. Hasler-Lewis received her BS in human nutrition from Michigan State University, and an MS in nutrition science from The Pennsylvania State University. In 1990, she was awarded a dual PhD in environmental toxicology and human nutrition from Michigan State University. From 1990 to 1992, she was a postdoctoral fellow in the Laboratory of Cellular Carcinogenesis and Tumor Promotion at the National Cancer Institute. She received her MBA from the University of Illinois at Urbana-Champaign in May 2003.

From 1992 to 2000, she served as the founding director of the Functional Foods for Health (FFH) Program—a joint effort between the Chicago (UIC) and Urbana-Champaign (UIUC) campuses of the University of Illinois.

In February 2004, she was appointed founding executive director of the Robert Mondavi Institute for Wine and Food Science (RMI) at the University of California, Davis. In this capacity, Dr. Hasler-Lewis leads programming and vision-development efforts for the Institute. She also serves as the University's primary liaison to the wine and food industries. The RMI is poised to become the global innovator in university-based wine and food programs and will house the world's largest and most prestigious wine and food-science academic program.

In 1998, Hasler-Lewis was recognized as one of the "Top 25 Food Influentials" by *Self Magazine*.